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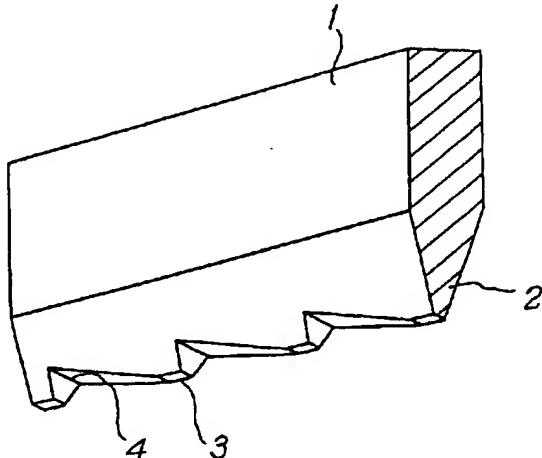
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(54)【発明の名称】 プラスチックシート用野線形成刃

(57)【要約】

【課題】 折曲部が所定角度に仕上がり、折曲部に隣接する平面部が弯曲し難く、又、折曲性が良好で、自動製函機による高速製函を安定して行うことができる野線を容易に付設することができる野線形成刃を提供する。

【解決手段】 本発明の野線形成刃1は、刃先形状を長さ方向に断続する鋸刃状としてある。そして、刃先2の頂面部3の長さAを0~3mm、刃先2の傾斜部4の長さBを0.3~3mm、頂面部3と傾斜部4の最深部との距離Cを0.02~0.5mm、頂面部の幅Dを0~0.5mm、刃先角度θを20~130°としてある。



【特許請求の範囲】

【請求項1】 刃先形状が長さ方向に断続する鋸刃状であり、刃先の頂面部の長さが0～3mm、刃先の傾斜部の長さが0.3～3mm、頂面部と傾斜部の最深部との距離が0.02～0.5mm、頂面部の幅が0～0.5mm、刃先角度が20～130°であることを特徴とするプラスチックシート用野線形成刃。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、プラスチックシートに折曲用野線を付設するための野線形成刃に関する。

【0002】

【従来の技術】 プラスチックシートを折曲加工し、人形ケース、包装容器等のプラスチックケースに加工する場合、プラスチックシートに折曲用野線を付設し、この折曲用野線に沿って折曲加工する。従来の折曲用野線として、図9に示すように、プラスチックシート51の厚み方向に野線形成刃を押圧して形成する凹溝状野線52が知られているが、この野線52は、底部に凹凸がなく、深さが均一なものであった。

【0003】

【発明が解決しようとする課題】 上記野線52を付設したプラスチックシート51は、折曲加工時に、折曲部53がその有する弾性により形状を回復して、所定角度に仕上がりなかつたり、折曲加工後に、折曲部53に発生する残留応力の影響を受けて、隣接する平面部54が湾曲し易いという問題があつた。又、最近では、自動製函機により高速に製函するため、折曲性が良好な野線が求められているが、上記野線52では折曲性が不十分であり、自動製函機による高速製函を安定して行うことができなかつた。

【0004】 上記野線52でも、刃先の鋭い野線形成刃をプラスチックシート51の厚み方向に深く進入させて深い野線を形成すれば、折曲性をかなり向上させることができると、深い野線を長さ方向に均一に形成することは難しく、安定した折曲性を有する野線を付設することができないという問題があつた。

【0005】 又、特開平1-141720号公報には凹凸状の刃先を有する野線形成刃が提案されており、この野線形成刃により形成される凹凸状野線によれば折曲性は確かに向上するが、野線形成刃の刃先凹部の形状は平坦面であるため、凹凸状野線を形成する際にかなりの押圧力を負荷する必要があり、押圧力を制御して均一に凹凸状野線を付設することは困難であった。特に、プラスチックシートの多数平面部に凹凸状野線を付設するのは困難であった。

【0006】 本発明は、上記問題点に鑑みて為されたものであり、折曲部が所定角度に仕上がり、折曲部に隣接する平面部が湾曲し難く、又、折曲性が良好で、自動製函機による高速製函を安定して行うことができる野線を

容易に付設することができる野線形成刃を提供することを目的とする。

【0007】

【課題を解決するための手段】 上記目的を達成するため、本発明の野線形成刃は、刃先形状が長さ方向に断続する鋸刃状であり、刃先の頂面部の長さが0～3mm、刃先の傾斜部の長さが0.3～3mm、頂面部と傾斜部の最深部との距離が0.02～0.5mm、頂面部の幅が0～0.5mm、刃先角度が20～130°であることを特徴とするものである。

【0008】

【発明の実施の形態】 以下、本発明の野線形成刃について、図面を参照して説明する。

【0009】 図1は本発明のプラスチックシート用野線形成刃の部分斜視図、図2は図1の野線形成刃及び付設された野線の部分側面断面図、図3は図1の野線形成刃及び付設された野線の部分正面断面図、図4は付設された野線の他例を示す部分正面断面図である。

【0010】 本発明の野線形成刃1は、図1乃至図3に示すように、刃先形状を長さ方向に断続する鋸刃状とし、刃先2の頂面部3の長さAを0～3mm、刃先2の傾斜部4の長さBを0.3～3mm、頂面部3と傾斜部4の最深部との距離Cを0.02～0.5mm、頂面部の幅Dを0～0.5mm、刃先角度θを20～130°としてある。

【0011】 ここで、刃先2の頂面部3の長さAが3mmより長いと、プラスチックシート5の野線6の薄内部7が破損し易く、破損した時に貫通孔が目立ち、外観上好ましくない。刃先2の傾斜部4の長さBが0.3mmより短いと、プラスチックシート5の野線6の厚内部8の長さが短すぎて、精度よく野線6を形成することができず、3mmより長いと、野線6において折曲した時に、厚内部8において変形し易い等の問題が発生する。

【0012】 頂面部3と傾斜部4の最深部との距離Cが0.02mmより短いと、野線6全体が薄くなり、プラスチックシート5が野線6において破損し易く、0.5mmより長いと、野線6の薄内部7と厚内部8との肉厚差が大きくなつて、折曲した時に、野線6全体が凸凹状に変形して、外観上好ましくないし、傾斜部4が厚くなりすぎて、折曲性改良の効果が期待できなくなる。尚、頂面部3と傾斜部4の最深部との距離Cは、プラスチックシート5の厚さEの30～70%の範囲内とすれば、野線6の折曲性もよく、外観上も良好なので好ましい。

【0013】 頂面部3の幅Dが0.5mmより広いと、野線6が幅方向に広がつて破損し易くなるし、野線6付設の際に負荷する押圧力が大きくなり、野線6が精度よく形成できなくなる。又、刃先角度θが20°より小さいと、野線6の開口角度が小さくなつて、折曲角度が大きい場合に開口端同士が当たつてしまい、野線6を付設した効果が小さくなり、130°より大きいと、野線6

を付設する際に負荷する押圧力が大きくなり、野線6が精度よく形成できなくなる。

【0014】図3に示すように、平坦な受け台9上にプラスチックシート5を載置し、野線形成刃1をプラスチックシート5に押圧することにより、プラスチックシート5には刃先2の頂面部3に対応する薄肉部7、及び傾斜部4に対応する厚肉部8からなる野線6が形成される。

【0015】野線形成刃1と受け台9とによりプラスチックシート5を狭圧する圧力を高くすると、野線6の薄肉部7が開口して、図4に示すような断続孔10となる野線11が形成されることもある。

【0016】本発明の野線形成刃1により野線6、11を付設するプラスチックシート5としては、ポリ塩化ビニル、ポリプロピレン、ポリエチレン、ポリスチレン等の硬質シートを用いることができ、シート厚さとしては、0.1~1.0mm程度のものを使用するのが好ましい。

【0017】尚、野線形成刃1、受け台9は、より小さな押圧力で野線6、11を形成できるように、野線形成時に加熱しておいてもよい。又、野線形成刃1を円盤状として、連続的に野線6、11を形成するようにしてもよい。

【0018】上記のようにして形成された薄肉部7又は断続孔10が、野線6、11においてプラスチックシート5を折曲した時に、野線6、11に発生する歪み及び応力を長さ方向に分散して均一化し、局部的な応力集中を防止するとともに、弾性による形状回復を防止する。

【0019】図5は本発明のプラスチックシート用野線形成刃の他実施例の部分斜視図、図6は図5の野線形成刃及び付設された野線の部分側面断面図、図7は図5の野線形成刃及び付設された野線の部分正面断面図、図8は付設された野線の他例を示す部分正面断面図である。

【0020】図5乃至図7に示す野線形成刃31は、やはり、刃先形状を長さ方向に断続する鋸刃状としてあるが、図1乃至図3に示す野線形成刃1は傾斜部4の最深部が傾斜部4の一端部に位置しているのに対し、傾斜部34の最深部が傾斜部34の中央部に位置している点で相違するものである。

【0021】しかし、野線形成刃31も、刃先32の頂面部33の長さA'、刃先32の傾斜部34の長さ*

* B'、頂面部33と傾斜部34の最深部との距離C'、頂面部34の幅D'、刃先角度θ'等の寸法、角度は、野線形成刃1と同様であり、作用、効果に関しては、野線形成刃1と同様である。

【0022】

【発明の効果】本発明の野線形成刃1は、刃先形状を長さ方向に断続する鋸刃状とし、刃先各部の寸法、角度を所定数値に設定したことにより、底部に断続薄肉部又は断続孔を有する折曲性が良好な野線を容易に付設することができる。そして、付設された野線によれば、薄肉部又は断続孔が野線に発生する歪み及び応力を長さ方向に分散して均一化し、局部的な応力集中を防止するとともに、弾性による形状回復を防止するから、プラスチックシートの折曲角度が正確になり、平面部の平面性も良好となる。

【図面の簡単な説明】

【図1】本発明のプラスチックシート用野線形成刃の一実施例の部分斜視図である。

【図2】図1の野線形成刃及び付設された野線の部分側面断面図である。

【図3】図1の野線形成刃及び付設された野線の部分正面断面図である。

【図4】図1の野線形成刃により付設された野線の他例を示す部分正面断面図である。

【図5】本発明のプラスチックシート用野線形成刃の他実施例の部分斜視図である。

【図6】図5の野線形成刃及び付設された野線の部分側面断面図である。

【図7】図5の野線形成刃及び付設された野線の部分正面断面図である。

【図8】図5の野線形成刃により付設された野線の他例を示す部分正面断面図である。

【図9】従来の野線を付設したプラスチックシートの部分斜視図である。

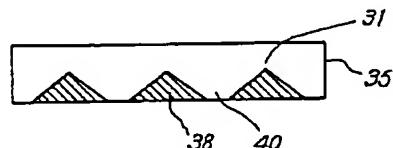
【符号の説明】

- 1 野線形成刃
- 2 刃先
- 3 頂面部
- 4 傾斜部
- 5 プラスチックシート
- 6 野線

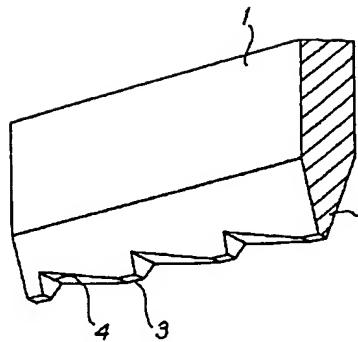
【図4】



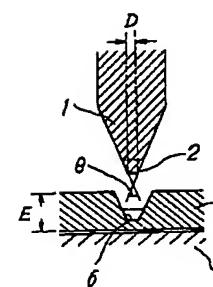
【図8】



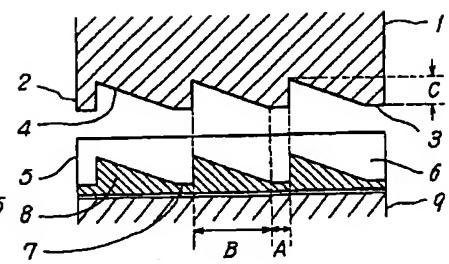
【図1】



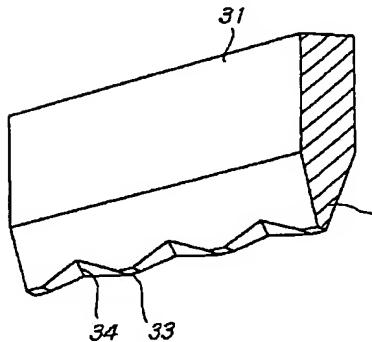
【図2】



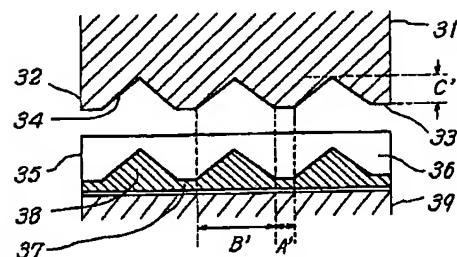
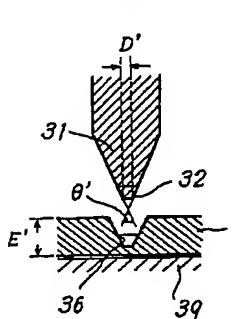
【図3】



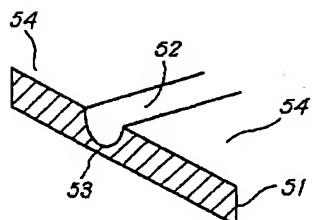
【図5】



【図6】



【図9】



【公報種別】特許法第17条の2の規定による補正の掲載

【部門区分】第2部門第4区分

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【手続補正書】

【提出日】平成13年5月18日(2001.5.18)

【手続補正1】

【補正対象書類名】明細書

【補正対象項目名】発明の名称

【補正方法】変更

【補正内容】

【発明の名称】プラスチックシート用野線形成刃及び
プラスチックシート

【手続補正2】

【補正対象書類名】明細書

【補正対象項目名】特許請求の範囲

【補正方法】変更

【補正内容】

【特許請求の範囲】

【請求項1】刃先形状が長さ方向に断続する鋸刃状であり、刃先の頂面部の長さが0~3mm、刃先の傾斜部の長さが0.3~3mm、頂面部と傾斜部の最深部との距離が0.02~0.5mm、頂面部の幅が0~0.5mm、刃先角度が20~130°であることを特徴とするプラスチックシート用野線形成刃。

【請求項2】請求項1のプラスチックシート用野線形成刃により付設してなる野線を備えたプラスチックシート。

【手続補正3】

【補正対象書類名】明細書

【補正対象項目名】0001

【補正方法】変更

【補正内容】

【0001】

【発明の属する技術分野】本発明は、プラスチックシートに折曲用野線を付設するための野線形成刃、及びそれにより付設してなる野線を備えたプラスチックシートに関する。

【手続補正4】

【補正対象書類名】明細書

【補正対象項目名】0006

【補正方法】変更

【補正内容】

【0006】本発明は、上記問題点に鑑みて為されたものであり、折曲部が所定角度に仕上がり、折曲部に隣接する平面部が湾曲し難く、又、折曲性が良好で、自動製版機による高速製版を安定して行うことができる野線を容易に付設することができる野線形成刃、並びにそれにによって付設してなる野線を備えたプラスチックシートを提供することを目的とする。

【手続補正5】

【補正対象書類名】明細書

【補正対象項目名】0008

【補正方法】変更

【補正内容】

【0008】

【発明の実施の形態】以下、本発明の野線形成刃及びプラスチックシートについて、図面を参照して説明する。

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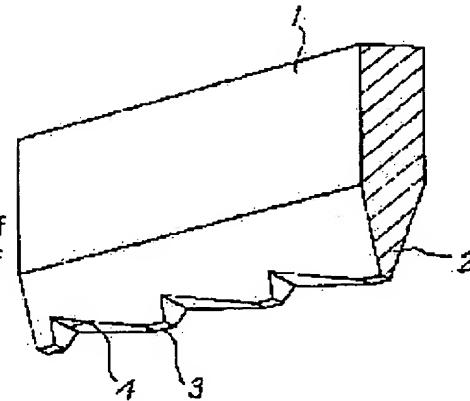
(72)Inventor : MIMASU YOSHIKAZU

(54) RULED LINE FORMING BLADE FOR PLASTIC SHEET

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a ruled line forming blade 1, capable of easily setting a ruled line, which enables a bent part to be finished at a specified angle and hardly makes an adjacent planar part to the bent part curved and further, shows smooth bending performance, ensuring the stable and rapid manufacture of boxes using an automatic box making machine.

SOLUTION: This ruled line forming blade 1 has a serrated edge 2 which is intermittent in the longitudinal direction. In addition, the blade 1 has 0-3 mm length A of the apex face part 3 of the edge 2, 0.3-3 mm length B of the slant part 4 of the edge 2, 0.02-0.5 mm distance C between the apex face part 3 and the deepest part of the slant part 4, 0-0.5 mm width D of the apex face part 3 and 20-130° angle θ of the edge 2.



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CLAIMS

[Claim(s)]

[Claim 1] The ruled line formation cutting edge for sheets plastic with which an edge-of-a-blade configuration has the shape of a serrated knife which is intermittent in the die-length direction, and the die length of the top-face section of the edge of a blade is characterized by the width of face of 0.02-0.5mm and the top-face section being [the die length of the ramp of 0-3mm and the edge of a blade / whenever / 0-0.5mm and tool angle] 20-130 degrees for the distance of 0.3-3mm, the top-face section, and the deepest part of a ramp.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the ruled line formation cutting edge for attaching the ruled line for bending to a sheet plastic.

[0002]

[Description of the Prior Art] When carrying out folding of the sheet plastic and processing it into plastics cases, such as a doll case and a container, the ruled line for bending is attached to a sheet plastic, and folding is carried out along with this ruled line for bending. Although the concave-like ruled line 52 which presses and forms a ruled line formation cutting edge in the thickness direction of a sheet plastic 51 was known as a conventional ruled line for bending as shown in drawing 9, this ruled line 52 did not have irregularity in a pars basilaris ossis occipitalis, and its depth was uniform.

[0003]

[Problem(s) to be Solved by the Invention] At the time of folding, the bending section 53 recovered the configuration with the elasticity which it has, and the sheet plastic 51 which attached the above-mentioned ruled line 52 had the problem that it was not finished at a predetermined include angle, or the flat-surface section 54 which adjoins in response to the effect of the residual stress generated at the bending section 53 tends to curve after folding. Moreover, although the ruled line with good bending nature was recently called for in order to carry out box producing to a high speed with an automatic box-producing machine, the above-mentioned ruled line 52 of bending nature was inadequate, it was stabilized and high-speed box producing by the automatic box-producing machine was not able to be performed.

[0004] Although bending nature could be considerably raised when making the ruled line formation cutting edge with the sharp edge of a blade advance in the thickness direction of a sheet plastic 51 deeply and forming the deep ruled line also by the above-mentioned ruled line 52, forming a deep ruled line in the die-length direction at homogeneity had the problem that it was difficult and the ruled line which has the stable bending nature could not be attached.

[0005] Moreover, the ruled line formation cutting edge which has the concave convex edge of a blade was proposed by JP,1-141720,A, according to the concave convex ruled line formed with this ruled line formation cutting edge, surely bending nature improved, but since the configuration of the edge-of-a-blade crevice of a ruled line formation cutting edge was a flat side, it was difficult [it] to carry out the load of the remarkable thrust, in case a concave convex ruled line is formed, to control thrust, and to attach a concave convex ruled line to homogeneity. It was difficult especially to attach a concave convex ruled line to the a large number flat-surface section of a sheet plastic.

[0006] In view of the above-mentioned trouble, it succeeds in this invention, the bending section is finished at a predetermined include angle, and the flat-surface section which adjoins the bending section cannot curve easily, and bending nature is good and it aims at offering the ruled line formation cutting edge which can attach easily the ruled line which is stabilized and can perform high-speed box producing by the automatic box-producing machine.

[0007]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the ruled line formation cutting edge of this invention has the shape of a serrated knife to which an edge-of-a-blade configuration is intermittent in the die-length direction, and the die length of the top-face section of the edge of a blade is characterized by the width of face of 0.02-0.5mm and the top-face section being [the die length of the ramp of 0-3mm and the edge of a blade / whenever / 0-0.5mm and tool angle] 20-130 degrees for the distance of 0.3-3mm, the top-face section, and the deepest part of a ramp.

[0008]

[Embodiment of the Invention] Hereafter, the ruled line formation cutting edge of this invention is explained with reference to a drawing.

[0009] It is the partial transverse-plane sectional view showing the other examples of the ruled line by which the partial perspective view of the ruled line formation cutting edge for sheets plastic of this invention and drawing 2 were attached for drawing 1, and the ruled line formation cutting edge of drawing 1 and the partial transverse-plane sectional view of the attached ruled line, and drawing 4 were attached for the ruled line formation cutting edge of drawing 1 and the partial side-face sectional view of the attached ruled line, and drawing 3.

[0010] The ruled line formation cutting edge 1 of this invention makes an edge-of-a-blade configuration the shape of a serrated knife which is intermittent in the die-length direction, as shown in drawing 1 thru/or drawing 3. theta is made [die-length A of the top-face section 3 of the edge of a blade 2 / 0-3mm and die-length B of the ramp 4 of the edge of a blade 2 / the distance C of 0.3-3mm, the top-face section 3, and the deepest part of a ramp 4] into 20-130 degrees for the width of face D of 0.02-0.5mm and the top-face section whenever [0-0.5mm and tool angle].

[0011] the time of being easy to damage the thin-walled part 7 of the ruled line 6 of a sheet plastic 5, and being damaged here, when die-length A of the top-face section 3 of the edge of a blade 2 was longer than 3mm -- a through tube -- conspicuous -- an exterior -- it is not desirable. When die-length B of the ramp 4 of the edge of a blade 2 is shorter than 0.3mm, the die length of the heavy-gage part 8 of the ruled line 6 of a sheet plastic 5 is too short to form a ruled line 6 with a sufficient precision but, and when longer [than 3mm] and it bends in a ruled line 6, the problem of being easy to deform in a heavy-gage part 8 occurs.

[0012] If the distance C of the top-face section 3 and the deepest part of a ramp 4 is shorter than 0.02mm If the ruled line 6 whole becomes thin, and it is easy to damage a sheet plastic 5 in a ruled line 6 and longer than 0.5mm the time of the thick difference of the thin-walled part 7 of a ruled line 6 and a heavy-gage part 8 becoming large, and bending -- the ruled line 6 whole -- the letter of unevenness -- deforming -- an exterior -- a ramp 4 becomes thick too much preferably, and it becomes impossible to expect the effectiveness of bending nature amelioration In addition, the distance C of the top-face section 3 and the deepest part of a ramp 4 of the bending nature of the 30 - 70% of within the limits, then the ruled line 6 of thickness E of a sheet plastic 5 is also good, and since an exterior is also good, it is desirable.

[0013] When the width of face D of the top-face section 3 is wider than 0.5mm, the thrust which a ruled line 6 spreads crosswise, becomes easy to damage, and carries out a load in the case of ruled line 6 attachment becomes large, and it becomes impossible for a ruled line 6 to form with a sufficient precision. The thrust which carries out a load in case a ruled line 6 will be attached, if the effectiveness which whenever [angular aperture / of a ruled line 6] became small when theta was [whenever / tool angle] smaller than 20 degrees, opening edges hit when a bending include angle was large, and attached the ruled line 6 becomes small and it is larger than 130 degrees becomes large, and it becomes impossible moreover, to form with a precision sufficient [a ruled line 6].

[0014] As shown in drawing 3 , the ruled line 6 which consists of a thin-walled part 7 corresponding to the top-face section 3 of the edge of a blade 2 and a heavy-gage part 8 corresponding to a ramp 4 is formed in a sheet plastic 5 by laying a sheet plastic 5 on the flat cradle 9, and pressing the ruled line formation cutting edge 1 to a sheet plastic 5.

[0015] When the pressure which compresses a sheet plastic 5 by the ruled line formation cutting edge 1 and the cradle 9 is made high, the thin-walled part 7 of a ruled line 6 carries out opening,

and the ruled line 11 which consists of an intermittence hole 10 as shown in drawing 4 may be formed.

[0016] As a sheet plastic 5 which attaches ruled lines 6 and 11 with the ruled line formation cutting edge 1 of this invention, hard sheets, such as a polyvinyl chloride, polypropylene, polyester, and polystyrene, can be used, and it is desirable as sheet thickness to use an about 0.1-1.0mm thing.

[0017] In addition, the ruled line formation cutting edge 1 and a cradle 9 may be heated at the time of ruled line formation so that ruled lines 6 and 11 can be formed by smaller thrust. Moreover, you may make it form ruled lines 6 and 11 continuously, using the ruled line formation cutting edge 1 as disc-like.

[0018] When the thin-walled part 7 or the intermittence hole 10 formed as mentioned above bends a sheet plastic 5 in ruled lines 6 and 11, while distributing distortion and stress which are generated for ruled lines 6 and 11 in the die-length direction, equalizing and preventing local stress concentration, the configuration recovery by elasticity is prevented.

[0019] It is the partial transverse-plane sectional view showing the other examples of the ruled line by which the partial perspective view of the other examples of the ruled line formation cutting edge for sheets plastic of this invention and drawing 6 were attached for drawing 5 , and the ruled line formation cutting edge of drawing 5 and the partial transverse-plane sectional view of the attached ruled line, and drawing 8 were attached for the ruled line formation cutting edge of drawing 5 and the partial side-face sectional view of the attached ruled line, and drawing 7 .

[0020] Although the ruled line formation cutting edge 31 shown in drawing 5 thru/or drawing 7 is made into the shape of a serrated knife which is intermittent in the die-length direction in an edge-of-a-blade configuration too, the ruled line formation cutting edge 1 shown in drawing 1 thru/or drawing 3 is different to the deepest part of a ramp 4 being located in the end section of a ramp 4 in that the deepest part of a ramp 34 is located in the center section of the ramp 34.

[0021] However, the ruled line formation cutting edge 31 of dimensions, such as die-length A' of the top-face section 33 of the edge of a blade 32, die-length B' of the ramp 34 of the edge of a blade 32, distance C' of the top-face section 33 and the deepest part of a ramp 34, width-of-face D' of the top-face section 34, and tool angle whenever theta', and an include angle is the same as the ruled line formation cutting edge 1, and that of them is the same as the ruled line formation cutting edge 1 also about an operation and effectiveness.

[0022]

[Effect of the Invention] The bending nature which has an intermittence thin-walled part or an intermittence hole can attach a good ruled line to a pars basilaris ossis occipitalis easily by the ruled line formation cutting edge 1 of this invention having made the edge-of-a-blade configuration the shape of a serrated knife which is intermittent in the die-length direction, and having set the dimension of each part of the edge of a blade, and the include angle as the predetermined number value. And since the configuration recovery by elasticity is prevented while according to the attached ruled line a thin-walled part or an intermittence hole distributes distortion and stress which are generated for a ruled line in the die-length direction, equalizes and prevents local stress concentration, the bending include angle of a sheet plastic becomes exact, and the smoothness of the flat-surface section also becomes good.

[Translation done.]

TECHNICAL FIELD

[Field of the Invention] This invention relates to the ruled line formation cutting edge for attaching the ruled line for bending to a sheet plastic.

[Translation done.]

PRIOR ART

[Description of the Prior Art] When carrying out folding of the sheet plastic and processing it into plastics cases, such as a doll case and a container, the ruled line for bending is attached to a sheet plastic, and folding is carried out along with this ruled line for bending. Although the concave-like ruled line 52 which presses and forms a ruled line formation cutting edge in the thickness direction of a sheet plastic 51 was known as a conventional ruled line for bending as shown in drawing 9 , this ruled line 52 did not have irregularity in a pars basilaris ossis occipitalis, and its depth was uniform.

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EFFECT OF THE INVENTION

[Effect of the Invention] The bending nature which has an intermittence thin-walled part or an intermittence hole can attach a good ruled line to a pars basilaris ossis occipitalis easily by the ruled line formation cutting edge 1 of this invention having made the edge-of-a-blade configuration the shape of a serrated knife which is intermittent in the die-length direction, and having set the dimension of each part of the edge of a blade, and the include angle as the predetermined number value. And since the configuration recovery by elasticity is prevented while according to the attached ruled line a thin-walled part or an intermittence hole distributes distortion and stress which are generated for a ruled line in the die-length direction, equalizes and prevents local stress concentration, the bending include angle of a sheet plastic becomes exact, and the smoothness of the flat-surface section also becomes good.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] At the time of folding, the bending section 53 recovered the configuration with the elasticity which it has, and the sheet plastic 51 which attached the above-mentioned ruled line 52 had the problem that it was not finished at a predetermined include angle, or the flat-surface section 54 which adjoins in response to the effect of the residual stress generated at the bending section 53 tends to curve after folding. Moreover, although the ruled line with good bending nature was recently called for in order to carry out box producing to a high speed with an automatic box-producing machine, the above-mentioned ruled line 52 of bending nature was inadequate, it was stabilized and high-speed box producing by the automatic box-producing machine was not able to be performed.

[0004] Although bending nature could be considerably raised when making the ruled line formation cutting edge with the sharp edge of a blade advance in the thickness direction of a sheet plastic 51 deeply and forming the deep ruled line also by the above-mentioned ruled line 52, forming a deep ruled line in the die-length direction at homogeneity had the problem that it was difficult and the ruled line which has the stable bending nature could not be attached.

[0005] Moreover, the ruled line formation cutting edge which has the concave convex edge of a blade was proposed by JP,1-141720,A, according to the concave convex ruled line formed with this ruled line formation cutting edge, surely bending nature improved, but since the configuration of the edge-of-a-blade crevice of a ruled line formation cutting edge was a flat side, it was difficult [it] to carry out the load of the remarkable thrust, in case a concave convex ruled line is formed, to control thrust, and to attach a concave convex ruled line to homogeneity. It was difficult especially to attach a concave convex ruled line to the a large number flat-surface section of a sheet plastic.

[0006] In view of the above-mentioned trouble, it succeeds in this invention, the bending section is finished at a predetermined include angle, and the flat-surface section which adjoins the bending section cannot curve easily, and bending nature is good and it aims at offering the ruled line formation cutting edge which can attach easily the ruled line which is stabilized and can perform high-speed box producing by the automatic box-producing machine.

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MEANS

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the ruled line formation cutting edge of this invention has the shape of a serrated knife to which an edge-of-a-blade configuration is intermittent in the die-length direction, and the die length of the top-face section of the edge of a blade is characterized by the width of face of 0.02~0.5mm and the top-face section being [the die length of the ramp of 0~3mm and the edge of a blade / whenever / 0~0.5mm and tool angle] 20~130 degrees for the distance of 0.3~3mm, the top-face section, and the deepest part of a ramp.

[0008]

[Embodiment of the Invention] Hereafter, the ruled line formation cutting edge of this invention is explained with reference to a drawing.

[0009] It is the partial transverse-plane sectional view showing the other examples of the ruled line by which the partial perspective view of the ruled line formation cutting edge for sheets plastic of this invention and drawing 2 were attached for drawing 1, and the ruled line formation cutting edge of drawing 1 and the partial transverse-plane sectional view of the attached ruled line, and drawing 4 were attached for the ruled line formation cutting edge of drawing 1 and the partial side-face sectional view of the attached ruled line, and drawing 3.

[0010] The ruled line formation cutting edge 1 of this invention makes an edge-of-a-blade configuration the shape of a serrated knife which is intermittent in the die-length direction, as shown in drawing 1 thru/or drawing 3. theta is made [die-length A of the top-face section 3 of the edge of a blade 2 / 0~3mm and die-length B of the ramp 4 of the edge of a blade 2 / the distance C of 0.3~3mm, the top-face section 3, and the deepest part of a ramp 4] into 20~130 degrees for the width of face D of 0.02~0.5mm and the top-face section whenever [0~0.5mm and tool angle].

[0011] the time of being easy to damage the thin-walled part 7 of the ruled line 6 of a sheet plastic 5, and being damaged here, when die-length A of the top-face section 3 of the edge of a blade 2 was longer than 3mm -- a through tube -- conspicuous -- an exterior -- it is not desirable. When die-length B of the ramp 4 of the edge of a blade 2 is shorter than 0.3mm, the die length of the heavy-gage part 8 of the ruled line 6 of a sheet plastic 5 is too short to form a ruled line 6 with a sufficient precision but, and when longer [than 3mm] and it bends in a ruled line 6, the problem of being easy to deform in a heavy-gage part 8 occurs.

[0012] If the distance C of the top-face section 3 and the deepest part of a ramp 4 is shorter than 0.02mm If the ruled line 6 whole becomes thin, and it is easy to damage a sheet plastic 5 in a ruled line 6 and longer than 0.5mm the time of the thick difference of the thin-walled part 7 of a ruled line 6 and a heavy-gage part 8 becoming large, and bending -- the ruled line 6 whole -- the letter of unevenness -- deforming -- an exterior -- a ramp 4 becomes thick too much preferably, and it becomes impossible to expect the effectiveness of bending nature amelioration In addition, the distance C of the top-face section 3 and the deepest part of a ramp 4 of the bending nature of the 30~70% of within the limits, then the ruled line 6 of thickness E of a sheet plastic 5 is also good, and since an exterior is also good, it is desirable.

[0013] When the width of face D of the top-face section 3 is wider than 0.5mm, the thrust which a ruled line 6 spreads crosswise, becomes easy to damage, and carries out a load in the case of

ruled line 6 attachment becomes large, and it becomes impossible for a ruled line 6 to form with a sufficient precision. The thrust which carries out a load in case a ruled line 6 will be attached, if the effectiveness which whenever [angular aperture / of a ruled line 6] became small when theta was [whenever / tool angle] smaller than 20 degrees, opening edges hit when a bending include angle was large, and attached the ruled line 6 becomes small and it is larger than 130 degrees becomes large, and it becomes impossible moreover, to form with a precision sufficient [a ruled line 6].

[0014] As shown in drawing 3, the ruled line 6 which consists of a thin-walled part 7 corresponding to the top-face section 3 of the edge of a blade 2 and a heavy-gage part 8 corresponding to a ramp 4 is formed in a sheet plastic 5 by laying a sheet plastic 5 on the flat cradle 9, and pressing the ruled line formation cutting edge 1 to a sheet plastic 5.

[0015] When the pressure which compresses a sheet plastic 5 by the ruled line formation cutting edge 1 and the cradle 9 is made high, the thin-walled part 7 of a ruled line 6 carries out opening, and the ruled line 11 which consists of an intermittence hole 10 as shown in drawing 4 may be formed.

[0016] As a sheet plastic 5 which attaches ruled lines 6 and 11 with the ruled line formation cutting edge 1 of this invention, hard sheets, such as a polyvinyl chloride, polypropylene, polyester, and polystyrene, can be used, and it is desirable as sheet thickness to use an about 0.1-1.0mm thing.

[0017] In addition, the ruled line formation cutting edge 1 and a cradle 9 may be heated at the time of ruled line formation so that ruled lines 6 and 11 can be formed by smaller thrust. Moreover, you may make it form ruled lines 6 and 11 continuously, using the ruled line formation cutting edge 1 as disc-like.

[0018] When the thin-walled part 7 or the intermittence hole 10 formed as mentioned above bends a sheet plastic 5 in ruled lines 6 and 11, while distributing distortion and stress which are generated for ruled lines 6 and 11 in the die-length direction, equalizing and preventing local stress concentration, the configuration recovery by elasticity is prevented.

[0019] It is the partial transverse-plane sectional view showing the other examples of the ruled line by which the partial perspective view of the other examples of the ruled line formation cutting edge for sheets plastic of this invention and drawing 6 were attached for drawing 5, and the ruled line formation cutting edge of drawing 5 and the partial transverse-plane sectional view of the attached ruled line, and drawing 8 were attached for the ruled line formation cutting edge of drawing 5 and the partial side-face sectional view of the attached ruled line, and drawing 7.

[0020] Although the ruled line formation cutting edge 31 shown in drawing 5 thru/or drawing 7 is made into the shape of a serrated knife which is intermittent in the die-length direction in an edge-of-a-blade configuration too, the ruled line formation cutting edge 1 shown in drawing 1 thru/or drawing 3 is different to the deepest part of a ramp 4 being located in the end section of a ramp 4 in that the deepest part of a ramp 34 is located in the center section of the ramp 34.

[0021] However, the ruled line formation cutting edge 31 of dimensions, such as die-length A' of the top-face section 33 of the edge of a blade 32, die-length B' of the ramp 34 of the edge of a blade 32, distance C' of the top-face section 33 and the deepest part of a ramp 34, width-of-face D' of the top-face section 34, and tool angle whenever theta', and an include angle is the same as the ruled line formation cutting edge 1, and that of them is the same as the ruled line formation cutting edge 1 also about an operation and effectiveness.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the partial perspective view of one example of the ruled line formation cutting edge for sheets plastic of this invention.

[Drawing 2] They are the ruled line formation cutting edge of drawing 1 , and the attached partial side-face sectional view of a ruled line.

[Drawing 3] They are the ruled line formation cutting edge of drawing 1 , and the attached partial transverse-plane sectional view of a ruled line.

[Drawing 4] It is the partial transverse-plane sectional view showing the other examples of the ruled line attached with the ruled line formation cutting edge of drawing 1 .

[Drawing 5] It is the partial perspective view of the other examples of the ruled line formation cutting edge for sheets plastic of this invention.

[Drawing 6] They are the ruled line formation cutting edge of drawing 5 , and the attached partial side-face sectional view of a ruled line.

[Drawing 7] They are the ruled line formation cutting edge of drawing 5 , and the attached partial transverse-plane sectional view of a ruled line.

[Drawing 8] It is the partial transverse-plane sectional view showing the other examples of the ruled line attached with the ruled line formation cutting edge of drawing 5 .

[Drawing 9] It is the partial perspective view of the sheet plastic which attached the conventional ruled line.

[Description of Notations]

- 1 Ruled Line Formation Cutting Edge
- 2 Edge of a Blade
- 3 Top-Face Section
- 4 Ramp
- 5 Sheet Plastic
- 6 Ruled Line

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CORRECTION OR AMENDMENT

[Kind of official gazette] Printing of amendment by the convention of 2 of Article 17 of Patent Law

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[Procedure revision]

[Filing Date] May 18, Heisei 13 (2001. 5.18)

[Procedure amendment 1]

[Document to be Amended] Specification

[Item(s) to be Amended] The name of invention

[Method of Amendment] Modification

[Proposed Amendment]

[Title of the Invention] The ruled line formation cutting edge for sheets plastic, and a sheet plastic

[Procedure amendment 2]

[Document to be Amended] Specification

[Item(s) to be Amended] Claim

[Method of Amendment] Modification

[Proposed Amendment]

[Claim(s)]

[Claim 1] The ruled line formation cutting edge for sheets plastic with which an edge-of-a-blade configuration has the shape of a serrated knife which is intermittent in the die-length direction, and the die length of the top-face section of the edge of a blade is characterized by the width of face of 0.02-0.5mm and the top-face section being [the die length of the ramp of 0-3mm and

the edge of a blade / whenever / 0-0.5mm and tool angle] 20-130 degrees for the distance of 0.3-3mm, the top-face section, and the deepest part of a ramp.

[Claim 2] The sheet plastic equipped with the ruled line which it comes to attach with the ruled line formation cutting edge for sheets plastic of claim 1.

[Procedure amendment 3]

[Document to be Amended] Specification

[Item(s) to be Amended] 0001

[Method of Amendment] Modification

[Proposed Amendment]

[0001]

[Field of the Invention] This invention relates to the ruled line formation cutting edge for attaching the ruled line for bending to a sheet plastic, and the sheet plastic equipped with the ruled line which this comes to attach.

[Procedure amendment 4]

[Document to be Amended] Specification

[Item(s) to be Amended] 0006

[Method of Amendment] Modification

[Proposed Amendment]

[0006] It is accomplished in view of the above-mentioned trouble, and the bending section is finished at a predetermined include angle, and the flat-surface section which adjoins the bending section cannot curve easily, and this invention aims at offering the ruled line formation cutting edge which can attach easily the ruled line which is stabilized and can perform high-speed box producing bending nature is good and according to an automatic box-producing machine, and the sheet plastic equipped with the ruled line which comes to attach to a list by it.

[Procedure amendment 5]

[Document to be Amended] Specification

[Item(s) to be Amended] 0008

[Method of Amendment] Modification

[Proposed Amendment]

[0008]

[Embodiment of the Invention] Hereafter, the ruled line formation cutting edge and sheet plastic of this invention are explained with reference to a drawing.

[Translation done.]